
**HOW DOES SERENDIPITY INFLUENCE THE INTERNATIONALIZATION
PROCESS? CAUSES AND RECOGNITION**

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Abstract

The purpose of this dissertation is to understand how serendipity can appear in the context of an internationalization process, what characteristics the entrepreneurs should have to recognize serendipitous opportunities and how does the internationalization process occur after that.

Two methodologies were used to answer the research question: the Critical Incident Technique (CIT) focused on the process of internationalization and its relation to serendipity and the fuzzy-set Qualitative Comparative Analysis (fsQCA) focused on the characteristics the entrepreneurs should have to be able to recognize a serendipitous opportunity.

The CIT allowed to support the revision of literature, as it was found that some circumstances produce serendipitous potential and that it is also necessary that entrepreneurs have a set of characteristics that make them able to recognize the opportunity generated by the event that proportionate serendipity. Fairs were added to the type of events that can trigger serendipity, as it was not predicted in the literature review. Some characteristics of the firm like innovation, flexibility, perseverance, quality control and knowledge were also added to the characteristics that might also influence serendipitous potential and were not mentioned in the literature review. Regarding the response to the exploitation of the opportunity, all companies displayed a rational response. The fuzzy-set Qualitative Comparative Analysis concluded that from the characteristics studied, there is not a key characteristic that the entrepreneurs should have to be able to recognize a serendipitous opportunity, and there is also not a key combination of various characteristics to do that recognition. Instead, there are several different combinations of characteristics that result in the same outcome, although it was found that there are two central characteristics.

These results allowed to support the revision of literature and contributions were made to the field: fairs were added to the type of events that can produce serendipitous potential, and some new characteristics of the firm were also found. It was concluded that the perfect entrepreneur does not exist, but instead, different types of entrepreneurs with diverse characteristics can lead to the same outcome.

Keywords: internationalization, serendipity, improvisation

JEL-code: M16

Resumo

O objetivo desta dissertação é perceber como é que a *serendipity* pode aparecer no contexto de um processo de internacionalização, que características os empreendedores devem ter para reconhecer uma oportunidade gerada pela *serendipity* e como é que o processo de internacionalização ocorre depois desse reconhecimento: com uma resposta racional ou com improvisação.

Duas metodologias foram utilizadas para responder a esta questão: a Técnica do Incidente Crítico focou-se no processo de internacionalização e na sua relação com a *serendipity*; a *fuzzy-set Qualitative Comparative Analysis* focou-se nas características que o empreendedor deve ter para reconhecer uma oportunidade gerada pela *serendipity*.

A Técnica do Incidente Crítico permitiu suportar a revisão de literatura, e foi descoberto que existem circunstâncias que produzem potencial *serendipitous* e que também é necessário que os empreendedores tenham um conjunto de características que os tornem capazes de reconhecer a oportunidade gerada pelo evento. Feiras foram adicionadas ao tipo de eventos que podem despoletar a *serendipity*, sendo que este evento não foi mencionado na revisão de literatura. Algumas características da empresa como inovação, flexibilidade, perseverança, controlo de qualidade e conhecimento também foram adicionadas ao conjunto de características que podem vir a influenciar o potencial *serendipitous* e não foram mencionadas na revisão de literatura. Relativamente à resposta dada à exploração da oportunidade, todas as empresas demonstraram uma resposta racional. A *fuzzy-set Qualitative Comparative Analysis* concluiu que, das características estudadas, não há uma que seja considerada chave para o empreendedor ser capaz de reconhecer uma oportunidade gerada pela *serendipity*, e também não há uma combinação de características chave que resulte nesse reconhecimento. Em vez disso, há vários tipos de combinações de características que podem levar ao mesmo resultado, apesar de ter sido descoberto que existem duas características centrais.

Os resultados obtidos permitiram suportar a revisão de literatura e foram feitas contribuições para a área: feiras foram adicionadas ao tipo de eventos que pode produzir potencial *serendipitous* e algumas características da empresa também foram identificadas. Foi concluído que não existe o empreendedor perfeito, mas em vez disso existem vários tipos de empreendedores com diferentes características que podem levar ao mesmo resultado.

Palavras-chave: internacionalização, *serendipity*, improvisação

Código-JEL: M16

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1. Introduction

In 1977, Johanson and Vahlne state that the firm's internationalization process focuses on the development of the individual firm and especially on its gradual acquisition, integration, and use of knowledge about foreign markets and operations (Johanson and Vahlne, 1977).

Throughout the years, the model presented by Johanson and Vahlne and known as the Uppsala model has been revised, based on business practices advances that have happened since 1977. In 2009, the authors considered that relationships and networks present a potential for learning and building trust and commitment, relevant to internationalization (Johanson and Vahlne, 2009).

Although there are formal internationalization processes that firms can execute, like the Uppsala model (Johanson and Vahlne, 1977), the Network theory (Johanson and Mattsson, 1988) and, the Entrepreneurship view (Johanson and Vahlne, 2009; Schweizer et al., 2010), empirical research findings reveal a significant gap between the traditional models and the actual practice observed in companies (Evers and O'Gorman, 2011). Entering foreign markets can be seen as random and irrational (Coviello and Munro, 1995) and, establishing new contacts can often appear to be the product of chance encounters (Ellis and Pecotich, 2001).

A concept often used to describe random and apparently irrational movements is serendipity. The Oxford English Dictionary defines serendipity as: "*The faculty of making happy and unexpected discoveries by accident*" (Foster and Ford, 2003). This dissertation aims to study how serendipity can appear in the context of an internationalization process, what characteristics the entrepreneurs should have to recognize serendipitous opportunities and how does the internationalization process occur after that.

Merrilees et al. (1998) conclude that little literature addresses the likelihood of small and medium-sized enterprises using different approaches other than the classic formal planning. The authors also determined that "*international opportunities can arise unexpectedly, but their realization is not automatic.*" (Merrilees et al., 1998, p. 9).

Since there is not much literature about serendipity in this context, the study becomes relevant to the field. It will help fill this gap academically, and it will shape a path for future and more complex research about the topic. In practical terms, this study will benefit

companies as it will provide clear insight into what circumstances can produce serendipity and intel that will help recognize and exploit the opportunity. In this way, companies will be more prone to exploit opportunities and maybe tackle new markets. Companies will also benefit from knowing if these types of opportunities usually lead to a rational exploitation of the opportunity or if it leads to improvisation.

To perform this study, two methodologies were used. Since this was a subject that lacks literature, the first one was the Critical Incident Technique, which is an exploratory research tool. A set of mainly open interviews was performed to gather information. This methodology aimed to understand if the companies interviewed had ever encountered an opportunity generated by serendipity and how it did happen (if it did). The second methodology was the fuzzy-set Qualitative Comparative Analysis. It focused only on the entrepreneur's characteristics identified in the revision of literature as necessary to recognize an opportunity generated by serendipity. The goal was to see if any entrepreneur characteristic is vital to identifying a serendipitous opportunity and what combinations of characteristics can result in serendipitous opportunity recognition.

This dissertation is organized as follows: Chapter 2, The revision of literature, presents the evolution of the main internationalization processes and the findings of serendipity. Chapter 3, Methodology, describes the methodologies used and how the data was collected and organized. Chapter 4, Results, presents the information collected in the interviews and discusses the results according to the two different methodologies. At last, Chapter 5, Conclusion, presents the primary conclusions obtained, the biggest limitations and suggestions for future research.

2. Literature Review

To understand how the internationalization process works and how other factors like serendipity can impact it, it is essential to study this process since its emergence. Starting with a view that is focused on the firm (Uppsala model), moving to a focus on networks and relationships (Network theory), and then ending with a focus on the entrepreneur (Entrepreneurship view), it is possible to see how much this field has changed its way of thinking throughout the years.

Then, it is critical to understand how serendipity can arise in a firm, what circumstances can be produced to induce serendipity, and what capabilities might be needed to spot an opportunity generated by serendipity.

2.1 Uppsala model

In 1977, a model that would later be called the Uppsala model was introduced. The author's goal was to present a basic mechanism that could be applied to explain all the steps taken in internationalization (Johanson and Vahlne, 1977).

Thus, this internationalization process *“focuses on the development of the individual firm, and particularly on its gradual acquisition, integration, and use of knowledge about foreign markets and operations, and on its successively increasing commitment to foreign markets”* (Johanson and Vahlne, 1977, p. 1). Lack of knowledge can be considered an obstacle, and the expertise needed can be obtained only via operations abroad (Johanson and Vahlne, 1977). Not only can firms get new information by operating in a different environment, but they can also become connected to the market in a way that makes it hard for its resources to be used for other purposes (Forsgren, 2002).

The Uppsala model assumes gradual internationalization; firms follow a chain of events. For example, firms start by validating their entries in foreign countries through contracts with the companies operating in the other markets. These contracts are then replaced with their agents when the sales are growing, and then if the growth continues, the firms can also begin to manufacture in the foreign market (Johanson and Vahlne, 2009). This model was later considered a stage model because of the suggestion that the internationalization process should occur in incremental steps (Campbell-Hunt and Chetty, 2004).

Knowledge is a big part of the internationalization process. In the Uppsala model, knowledge depends only on the firm itself and the capability to learn from its experience and not on knowledge that already exists (Forsgren, 2002).

Some critiques were made to the Uppsala model. One that can be highlighted is that this model neglects other forms of learning, like seeking new information and learning through imitative behavior (Forsgren, 2002). Also, this model has been accused of being too deterministic (Costa e Silva et al., 2012); the process of learning and acquiring new knowledge is linked to the determination of how and where firms should internationalize (Petersen et al., 2001).

Despite acknowledging these claims, Johanson and Vahlne denied that their model is deterministic in nature (Johanson and Vahlne, 2006; Johanson and Vahlne, 2009). The authors argue that an underlying relationship between two variables does not necessarily mean that one variable regulates the other. Instead, they believe that this relation can be one of influence instead, usually blended with other variables (Johanson and Vahlne, 2009).

2.2 Network theory

The business environment has been changing throughout the years, making the Uppsala model, and others, to be revised. In 1988, a model that portrayed industrial markets as networks of relationships among firms was developed. According to this model, a firm's internationalization creates and develops relationships with counterparts in foreign networks. Thus, the internationalization process is not only dependent on the international experience the firm has but also on the networks that the firm is inserted in.

In 1989, Hakansson and Snehota also state that entities are engaged in a constant exchange of relationships with other organizations and that each firm influences the other organization. The authors propose that the network model of the organization propositions refers to settings in which a group of other organizations represents the environment of the organization. This constant exchange leads to shared knowledge and the development of capabilities and solutions together (Hakansson and Snehota, 1989).

In 2009, Johanson and Vahlne acknowledge this change in the business environment and recognize that new knowledge could be acquired through relationships. The author's case

provided by a business network investigation has two sides: the first side claims that markets can be seen as networks of relationships where firms are connected; the second side alleges that relationships give a possibility for learning and developing trust and dedication (Johanson and Vahlne, 2009). The authors also state that the word connected indicates that trade in one relationship is associated with a trade in another relationship. These webs of connected relationships are often called business networks.

Thus, some effects of these exchanges of relationships absorb new knowledge and mutual adaptation, resulting in relationship development (Johanson and Kao, 2015).

Knowledge is one of the key elements behind a company's internationalization process (Casillas et al., 2009). Two types of knowledge should be considered. The initial is first-hand knowledge that derives from own experience. The following one is second-hand knowledge obtained from the relationships established by the firm (Costa e Silva et al., 2012). The authors concluded that both are used in a complementary way when going international.

A firm's success can be conditioned by the firm being in at least one or more networks. If the firm is part of a pertinent network, it is considered an "insider". On the other hand, if the firm does not belong to a relevant network it is considered an "outsider" (Johanson and Vahlne, 2009).

The choice of foreign market entry mode is built on the firms' knowledge and the knowledge provided by their network connections (Sharma and Blomstermo, 2003). These connections can be distinguished into two concepts: formal and informal. Formal is when the connection is business-related, and informal is when it happens through family or friends (Coviello and Munro, 1995). These relationships not only influence the foreign market selection and mode of entry, but also affect product development and market diversification activities (Coviello and Munro, 1997). This model can also be accused of being deterministic because the knowledge firms acquire is determined by the networks of relationships that the firm has, which determine all the internationalization evolution.

In 2018, Sinkovics et al. studied the effect of matching networks to overcome export barriers. The authors' findings clearly show a significant relief in the perceived internal export barriers, demonstrating that arranging a network of relationships with different actors is very helpful (Sinkovics et al., 2018).

Despite the changes this model incorporated regarding the criticism that it faced previously, it was still confronted with other topics like missing the entrepreneurship view that the owners of a firm can have.

2.3 Entrepreneurship view

With the revised version of the Uppsala model, Johanson and Vahlne (2009) also considered that internationalization has a lot in common with entrepreneurship and that knowledge and relationships can already be in the possession of the founding entrepreneur, before the internationalization. Schweizer et al. (2010) consider that internationalization should be seen as the outcome of an entrepreneurial action.

In 2000, Oviatt and McDougall defined international entrepreneurship as “*a combination of innovative, proactive, and risk-seeking behavior that crosses national borders and is intended to create value in organizations*” (Oviatt and McDougall, 2000, p. 3). However, five years later, the authors felt the need to update this definition to be coherent with other terms that are now relevant to entrepreneurship. Now, international entrepreneurship is seen as finding, enacting, assessing, and exploiting opportunities to produce services and future goods through national borders (Oviatt and McDougall, 2005).

In 2007, Corbett studied the effects of cognitive learning on the identification of entrepreneurial opportunities. The author identified a significant correlation between them. He acknowledged that to identify potential entrepreneurial opportunities, the individuals should own some previous knowledge and have cognitive skills to take advantage of the opportunity found (Corbett, 2007).

2.4 Serendipity

The Uppsala model (Johanson and Vahlne, 1977), the Network theory (Johanson and Mattsson, 1988), and the Entrepreneurship view (Johanson and Vahlne, 2009; Schweizer et al., 2010) are all models that seem to present perfect guidelines of what to do when moving operations abroad. In 2011, Evers and O’Gorman found that some empirical research findings reveal a significant gap between what the traditional models of the

internationalization process state and the actual practice observed in companies (Evers and O’Gorman, 2011). These models, for example, do not mention the cases when things simply happen by chance through serendipity.

The Oxford English Dictionary defines serendipity as: “*The faculty of making happy and unexpected discoveries by accident*” (Foster and Ford, 2003).

Throughout the years, several authors came up with very similar ideas about what serendipity is, how it can be triggered and how it can be exploited.

In 1996, Fine and Deegan sought to study how serendipity happens and how it can be obtained since they rejected the luck perspective of serendipity. The authors came up with three characteristics of serendipity: temporal, relational, and analytical aspects. The temporal aspects are in line with being exposed to particular events that will cause a considerable impact. Although these events can be described as unpredictable, a pattern can be detected because they tend to occur regularly. The relational aspects state that despite one not being able to predict in advance what contacts are going to be established, it can capitalize to the maximum the contacts that it does have. At last, the analytical aspects relates to the competence of forming ties between data and theory, discovering things that way (Fine and Deegan, 1996).

Regarding the relational aspects (mentioned by Fine and Deegan), Coviello and Munro (1995) share the same thought. They believe that although entering new markets can be seen as random and irrational because of the quick and diffused involvement, the networks cause this because they create opportunities that did not exist before (Coviello and Munro, 1995). Informal networks composed of family and friends also have an important role in the process of creating or discovering new opportunities. These opportunities can occur in a simple conversation in a cafe with friends or in family encounters.

Nahapiet and Ghoshal (1998) also share the same line of thought. The authors believe that meetings and social gatherings allow accidental ideas to appear, which may later lead to serendipitous growth of intellectual capital.

In 2002, Hao presented a framework where luck¹ can appear from the external environment (exogenous) and similarly from the environment inside the firm itself (endogenous). Examples of opportunities emerging from the external environment are private or asymmetric information; unique historical events; change in social-cultural trends and technology; a shift in customer taste and demand; etc. It is thus of great importance to be on the lookout for this kind of events. On the other hand, opportunities emerging from the firm itself can be triggered by certain behaviors like impulsive initiatives and risk takers (Hao, 2002). Therefore, it is essential for the firm that the entrepreneur possesses some characteristics.

Cunha et al. (2010) believe that serendipity can be triggered by a level of alertness on the entrepreneur, especially when the individual is acting mindfully. Deadlines and teamwork are also something that can trigger serendipity.

So, a firm with a proactive approach is more prone to be aware of situations that could bring new opportunities, and better spotting and exploiting lucky breaks (Hao, 2002). Hao (2002) also considers that maintaining an organizational cultural context that is open, innovative, and stimulating is expected to help.

Firms can thus increase the possibility of serendipity by producing certain circumstances for its emergence (Cunha, 2005). In other words, firms can develop the elements that lead to serendipity.

In 2009, Dew introduced a framework for discovering opportunities triggered by serendipity. By acknowledging and trying to master the areas of “prior knowledge”, “search”, and “contingency”, opportunities would be easier to identify. “Search” is the directed effort to finding something, and “contingency” is a fortunate accident. So, on the one hand, serendipity can be triggered by certain events, but also it can be looked at as a capability since it needs to be recognized.

Rond (2014) agrees and alerts to the fact that serendipity is not only related to chance and luck; serendipity is also a capability that comes from detecting “matching pairs” of events that are used for practical or strategical purposes (Rond, 2014).

¹ In this context, serendipity and luck are concepts that have similar descriptions.

So, serendipity is a capability. However, to develop this capacity of recognizing and taking advantage of a certain event, the entrepreneur needs to possess some characteristics (Rond, 2014). Napier and Vuong (2013) grouped these individual characteristics into three sets: general characteristics, openness and curiosity, and readiness and alertness.

General characteristics are, for example, motivation, social networks, an inclination to take risks, etc. Openness and curiosity are related to the ability of the entrepreneur to be able to notice and be curious. At last, readiness and alertness are the ability to detect something without being on the lookout for it and being also able to identify opportunities. An obstacle that is important to mention involving the willingness to be open and curious are the preconceived ideas that might make the entrepreneurs not look at some events with other eyes (Napier and Vuong, 2013). The important thing to retain is that some people will not have the capability to recognize and exploit the opportunity present in front of them, while others will.

Thus, two factors affect the discovery of serendipitous information: the individual (entrepreneur) and the organization (Napier and Vuong, 2013). At the level of the organization, it is present the culture of the firm and how it can boost or obstruct the probability of serendipity occurring. On the individual level, it is discussed the characteristics that entrepreneurs need to possess to identify serendipity.

There are ways to enhance organizational serendipity, regarding the firms' culture, like the interaction with various groups; disposition to share knowledge and trust the firm; accepting errors and experiments; and, at last, looking to serendipity as something pertinent and significant to the firm. The authors believe that without these capabilities', opportunities will probably be undetected.

Mirvahedi and Morrish (2017) also studied how serendipity is related to the discovery of new opportunities. The authors started by recognizing that opportunities are formed by the entrepreneur's ability to identify them rather than being on the lookout for them in defined searches. Moreover, as it was seen before, serendipity can be described as a capability to detect and exploit certain events, which some may perceive as luck and chance encounters. So, the term entrepreneurial serendipity emerged, and it was defined as discovering an opportunity through a casual or accidental search that can happen with or without higher levels of knowledge (Mirvahedi and Morrish, 2017). Thus, entrepreneurial serendipity can

happen when the entrepreneur seeks opportunities without anything in mind and with, or without, former knowledge.

2.4.1 Response to serendipity

Serendipity brings much uncertainty to a firm which can result in either an opportunity or a threat. After detecting these types of opportunities, companies can either build a strategy to deal with the serendipitous opportunity or they can improvise.

According to Bodwell and Chermack (2010), the existing literature about strategy has become very diverse, complex and substantial but the general thought regarding the ideas that surround strategy include “*how and why organizations think about, plan, implement, manage and revise their strategies*” (Bodwell and Chermack, 2010, p. 2).

Mintzberg et al. (1999) provide some general principles about strategies, as the authors came up with ten different “strategy schools” that emphasise on different methods to plan strategy spanning from planning, positioning, entrepreneurial, among others.

Strategies can emerge both from deliberate or emergent ideas (Mintzberg et al., 1999). Deliberate ideas usually specify the actions and plans to accomplish a certain goal (Bodwell and Chermack, 2010) while emergent ideas do not have an expressively defined pattern, as “*actions were taken, one by one, which converged over time to some sort of consistency or pattern*” (Mintzberg et al., 1999, p. 19).

Not all strategies come from deliberate ideas, as deliberate ideas are often criticized for not being flexible enough to take advantage of new-found opportunities. For that reason, emergent ideas become very important as they give space for companies to engage in new actions that evolve from past actions and newfound patterns, which will, in turn, lead to a new plan of action (Bodwell and Chermack, 2010). Therefore, emergent strategies are the ones that give companies the freedom to change their strategy along the way, according to what happens, but with consistency and planning, which is something very beneficial when dealing with serendipity.

Regarding improvisation, it is sometimes used in response to ambiguity. Cunha et al. (1999) believe that improvisation occurs when the firm recognizes an unanticipated event and needs

a fast action to react. Hmieleski and Corbett (2006) agree with this affirmation as they state that improvisation is an acceptable conduct when the entrepreneur faces irregular circumstances.

In 1999, after studying the short history of organizational improvisation, Cunha et al. came up with a new broad definition of organizational improvisation. The authors defined it as *“the conception of action as it unfolds, by an organization and/or its members, drawing on available material, cognitive, affective and social resources”* (Cunha et al., 1999, p. 4).

It is assumed that improvisation simplifies adaptation because it enables the capability to have a fast approach (because it is not necessary to follow a strict plan), which becomes a cause of competitive advantage (Cunha et al., 2012). Also, when sociocultural differences are low, improvisation is rather effective in the internationalization process (Prashantham and Floyd, 2012).

Hilmersson et al. (2020) declare that improvising requires an open mind and thinking outside the box. It becomes appropriate to use in the internationalization process when the company is conscious of its ignorance. Improvisation is thus used when the current knowledge the firm has is insufficient to find new targets and paths that stray from what is known to the company. This process of improvising can also bring new knowledge.

Despite being proven to be effective and useful for firms, improvisation has some limits. Sometimes, improvising can be considered complex and probably not necessary. This can happen because some companies choose to change in incremental steps, which means that they do not want or need to improvise; their goal is to improve with preceding anticipation (Weick, 1998).

2.5 Model of serendipity – recognition – response

Despite having a very deterministic approach, the Uppsala model, the Network theory and the Entrepreneurship view give important contributes that help understand serendipity in the internationalization process. The Uppsala model centres much of its attention on knowledge (Johanson and Vahlne, 1977), the Network theory on the importance of connections (Hakansson and Snehota, 1989) and, the Entrepreneurship view alerts that

entrepreneurs should have cognitive skills to recognize opportunities (Corbett, 2007). These are all things that were mentioned by authors when talking about what can trigger serendipity and that serendipity is also a capability that requires a set of characteristics to be recognized (Dew, 2009; Fine and Deegan, 1996; Rond, 2014).

Gathering all this information about how firms and entrepreneurs react when confronted with the possibility of serendipity results in a model (Model of serendipity - recognition - response) that describes the events and decisions the entrepreneurs must go through when interacting with serendipity (see figure 1).

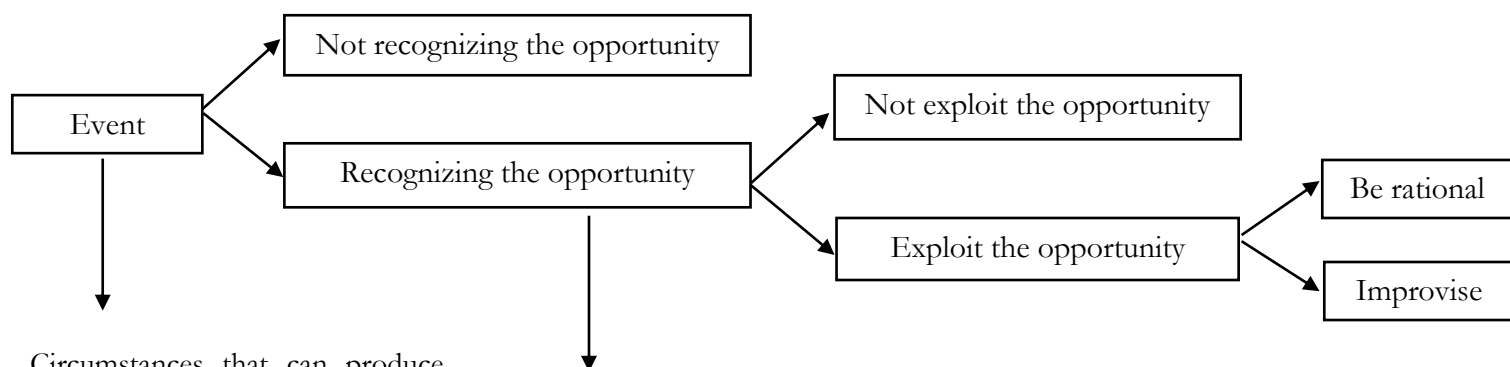
First, an event that is triggered by serendipity, occurs. This event brings an opportunity to the firm. As it was described in this section, there are a set of circumstances that can be produced for this event to be more likely to happen. These circumstances can be generated by the external environment like private or asymmetric information; unique historical events; change in social-cultural trends and technology; and a shift in customer taste and demand. These circumstances can also be generated from the internal environment: certain behaviors like impulsive initiatives, risk-taking behavior and the overall culture of the firm (Hao, 2002; Napier and Vuong, 2013). Other factors like temporal, relational, and analytical aspects can also generate serendipitous potential (Fine and Deegan, 1996).

When this event occurs, two things can happen: the opportunity is recognized, or the opportunity is not recognized. To recognize the opportunity, the entrepreneurs should possess a set of characteristics to facilitate this identification (Napier and Vuong, 2013). Some of these characteristics are the capacity of detecting match pairs (Rond, 2014); mastering: prior knowledge, search, and contingency (Dew, 2009); general characteristics like motivation, social networks, an inclination to take risks; openness and curiosity; and readiness and alertness (Napier and Vuong, 2013).

After recognizing the opportunity, there is a decision to be made: to exploit the opportunity or not exploit the opportunity. This decision takes into consideration the strategy and objectives of the firm.

If the entrepreneur decides to exploit the opportunity, there is one final decision: to display a rational response to the exploitation of the opportunity or to improvise.

This model helps answer the research questions as it provides a scheme for the information that is being searched for. This study aims to understand how serendipity can appear in the context of an internationalization process, what characteristics the entrepreneurs should have to recognize serendipitous opportunities and how does the internationalization process occur after that: with a rational response or with improvisation. In the model, it is possible to see, theoretically, how these things happen. The objective of this study is to see if this is also what happens in practical terms and if there any additions to the literature.



Circumstances that can produce the event (trigger serendipity):

- Externally: private or asymmetric information; unique historical events; change in social-cultural trends and technology; a shift in customer taste and demand (Hao, 2002);
- Internally: certain behaviors like impulsive initiatives; risk taking behavior and the culture of the firm (Hao, 2002; Napier and Vuong, 2013);
- Temporal aspects (Fine and Deegan, 1996);
- Relational aspects (Fine and Deegan, 1996);
- Analytical aspects (Fine and Deegan, 1996);

Characteristics the entrepreneur should have to recognize the opportunity (Napier and Vuong, 2013):

- Capacity of detecting match pairs (Rond, 2014);
- Mastering: prior knowledge, search and contingency (Dew, 2009);
- General characteristics: motivation, social networks, an inclination to take risks (Napier and Vuong, 2013);
- Openness and curiosity (Napier and Vuong, 2013);
- Readiness and alertness (Napier and Vuong, 2013).

Figure 1: Model of serendipity - recognition - response

3. Methodology

The concept of serendipity is well known in the field of the internationalization process. However, there is a lack of empirical studies that test how this concept actually influences the process of internationalization. Because of this gap, the research question “How does serendipity influence the internationalization process? Causes and recognition” emerged. It is going to be studied in the Portuguese economic context.

This is a question that triggers an exploratory research. Among the qualitative research methods, the Critical Incident Technique (CIT) is the one that will be used to answer the research question.

An innovative methodology called the fuzzy-set Qualitative Comparative Analysis (fsQCA) is used to access the entrepreneurs' characteristics that are necessary to recognize a serendipitous opportunity and also the entrepreneurs' characteristics mix (causal conditions) sufficient to reach the same solution (in this case, it is the recognition of a serendipitous opportunity) (Meneses et al., 2016).

3.1 Critical Incident Technique

Flanagan (1954) introduced the concept of CIT, and it surfaced from the World War II Aviation Psychology Program of the US Army Air Forces used for picking and categorizing aircrews. Throughout the years, the technique evolved into a qualitative research method. Now it consists of “*a qualitative research analysis of the events described by respondents, which bring memories of moments of satisfaction and dissatisfaction related to the subject matter of the research*” (Fischer et al., 2009, p. 1). This technique can facilitate the observation and categorization of human behavior (Fischer et al., 2009).

The CIT investigates what helps or hinders a specific experience or activity. It is an exploratory tool to use when there is interest to know more about less-known something (Butterfield et al., 2005).

Five steps should be followed when implementing the CIT: the first one is General Aims, the second is Plans and Specifications, the third one is Collecting the Data, the fourth is Analysing the Data, and the last is Interpreting and Reporting (Flanagan, 1954).

It is important to accentuate that these are not a set of strict rules. Instead, they should be looked at as a set of flexible principles that should be followed but adjusted to the different situations they are inserted in (Flanagan, 1954).

Using this type of qualitative methodology has many advantages. The focus on incidents and critical events and its narrative form makes the people being interviewed feel more open to sharing. Also, it has been established that the CIT is a versatile, adaptive, and robust research method (Butterfield et al., 2009).

In the previous section, it was stated that there are many internationalization processes, but with this study, the point is not to analyze a specific process but when the process is linked to serendipitous opportunities. It is also important to refer that all internationalization types will be considered to have a more significant sample.

Following the first and second steps of the CIT, an interview script was made². The interview was divided into two parts: a first part that was completely open and a second part that was semi-structured. The first part was to ask entrepreneurs to tell the story of how they endorsed in internationalizations to see if serendipity had anything to do with it. In that way study the critical incident. In the second part of the interview, the point was to know the entrepreneurs' qualifications to collect data for the second study.

3.2 Fuzzy-set Qualitative Comparative Analysis

The fuzzy-set Qualitative Comparative Analysis (fsQCA) is a somewhat new methodology in the field that was introduced by Ragin (2008). This methodology uses both qualitative and quantitative data to withdraw conclusions, and one of its advantages is its equifinality. This means that this methodology accepts different paths that lead to the same conclusion (Ragin, 2008). FsQCA methodology also considers the impacts of a combination of factors instead of only looking at an individual factor's effect.

² In appendix 6.1., it is provided the interview script.

To be able to conduct this study, in the interviews performed, there was a question that consisted in evaluating a set of characteristics on a 7-point Likert scale spanning from 1: the entrepreneur does not have this characteristic at all, to 7: the entrepreneur fully has this characteristic and 4: neutral. The characteristics chosen to be evaluated are the ones present in the model of serendipity – recognition – response: prior knowledge, searching for opportunities, social networks, inclination to take risks, motivation, curiosity, alertness, and capacity of detecting matching pairs.

The focus of this methodology was only on the entrepreneur's characteristics. This is, the characteristics necessary to recognize a serendipitous opportunity and to see if there are different combinations of characteristics that result in the same outcome: to recognize the opportunity.

The software used to perform this analysis was the fsQCA 3.0, and two tools were applied: necessary conditions analysis and truth table algorithm analysis. The necessary conditions analysis provides the conditions that are necessary to reach a specific output; while the truth table algorithm analysis provides the causal combinations that are possible to reach the same output. The truth table algorithm analysis delivers three different solutions: intermediate, parsimonious and complex. The solutions are based on different treatments of the combinations. The intermediate solution only shows the remainders that are “easy” to achieve (being “easy” is based on the information about the link between the causal condition and the outcome). The parsimonious solution shows the remainders that produce a logically simpler solution, regardless of it being “easy” or “difficult” (Ragin, 2017). The complex solution exhibits no logical remainders. According to Rihoux and Ragin (2009), the intermediate solution is superior to the complex and parsimonious solutions. Because of that, the intermediate solution will be analyzed; the parsimonious solution will be analyzed, too, since it is a subset of the intermediate solution. Together these two solutions lead to a better understanding of the central conditions.

3.3 Data collection

The third step of the CIT is collecting the data, and for that to happen, seventeen interviews were conducted: to sixteen companies and one association from various industries. From the sixteen companies and one association that were interviewed, ten interviews were made via

video call, six via e-mail, and one via phone call. From the ten interviews that were made via video call, eight were recorded and later transcribed. All the data gathered was put into the Nvivo software, and it was organized and coded according to the model of serendipity – recognition – response.

3.4 Sample

Table 1 presents general information about the companies (and association) interviewed: the sector they belong to, their size, and their predominant type of internationalization. To maintain the companies' (and association) anonymity throughout the analysis, they will be addressed as company A, company B, company C, and so on.

Table 1: Description of companies

Companies	Sector	Size	Type of Internationalization
Company A	Wine industry	SME	Export
Company B	Water supply industry	SME	Export
Company C	Honey industry	SME	Export
Company D	Metallurgy industry	SME	Export
Company E	Furniture industry	SME	Distribution and export
Company F	Beverages industry	Large	Export
Company G	Bicycle industry	SME	Export
Company H	Wine industry	SME	Export
Company I	Footwear industry	SME	Export
Company J	Insurance industry	SME	Export
Company K	Automation and add-ons industry	SME	Export
Company L	Wine industry	SME	Export
Company M	Toy industry	SME	Export
Company N	Biscuits industry	SME	Export
Company O	Ornamental Plants industry	SME	Export

Company P	Product design industry	SME	Export
Association Q	Anonymous	-	-

Note: SME stands for small and medium-sized enterprises

Most of the companies are small and medium-sized enterprises (SMEs) that predominantly internationalize through exportation.

3.5 Codification on Nvivo software

The interviews were coded considering the serendipity – recognition – response model presented in the final part of the revision of literature and new classifications that emerged from interviews.

The files are the transcripts/annotations of the interviews, so there are a total of seventeen files in the software. The references are the references present in each interview about a particular topic. Since there can be more than one reference on a specific topic and also more than one file associated with different codes, it is expected that the references and the number of files in total will exceed the number seventeen.

4. Analysis of Results

Following the fourth and fifth step of the Critical Incident Technique, this chapter presents the analysis and interpretation of the results obtained in the interviews. The data gathered will also be analyzed according to the fuzzy-set Qualitative Comparative Analysis. Before starting with the analysis itself, the companies will be introduced to create some background and context. It will be stated the industry the company is in, the person who was interviewed, if the company had any examples about serendipitous opportunities and some general information that might be relevant for further analysis.

Company A is a wine brand from the south of Portugal with a strong presence in its industry. When asked about serendipitous opportunities, the commercial director acknowledged that they exist and stated that they mostly happen through their network of contacts and fairs in their business model. This company uses a rational response when dealing with internationalization and attributes its success in recognizing opportunities to the brand's notoriety and the knowledge of its employees.

Company B is a water supply company. The director of the international area recognized that non-formal contacts have a significant impact regarding new opportunities that the company was not looking forward to executing in particular times. The director also stated that what makes the recognition and exploitation of these opportunities possible is mostly the wisdom of the technicians that oversee the international area as he stated that *"the knowledge of our technicians helps us in a rational way to see if the opportunity presented is significant or not."*

Company C is a micro company that is in the business of honey. The success of this company is greatly assigned to the innovation made around a simple product like honey. The CEO of the company said that *"almost all our external sales happened because we have an innovative product"*. Their culture of constantly presenting something new and choosing to communicate is what made their whole international path possible. International fairs, which they often get invited to go to, also helped.

Company D works in the metallurgy industry. This company focuses on dominating technology and constantly improving its processes of manufacturing. But despite this

emphasis on delivering the best quality products and having qualified products, the company manager acknowledges that this type of opportunities often happen and provided a real example that happened in the company. The manager told the story of when a business associate travelled to another country and came across a company of the same industry that was for sale. They then decided to purchase that company and start operating in that country.

Company E is a company that mainly produces tailor-made furniture. Their internationalization mostly occurs through exportation via distributors, except for a country where they opened a company in charge of the distribution. The person interviewed was quick to refute the hypotheses of serendipitous opportunities.

Company F is a very well positioned beverages company. The person interviewed is a business developer, and he established right away that this happens not only in the industry in which the company is working but also in others. According to the business developer, it is a general thing that can be recognized if the company is alert to its surroundings. The person provided an interesting example: legislation. Sometimes there are barriers to entry to specific markets. After some minor changes, the market of interest can become attractive again, so companies must always be alert to this kind of things. After that, the business developer stated that they always follow a strict process before engaging in any internationalization.

Company G operates in the bicycle industry. The person interviewed is responsible for the external market, which makes him responsible for anything related to exportation. Like other companies, the person interviewed also talked about the importance of a network of relations. Because of these networks, the company started operating in countries that were out of reach before. The person interviewed stated that *“These opportunities happen many times and it is important to maintain relationships for growth to happen”*. The company describes itself as having a multicultural vision and always being on the lookout for new opportunities. After that, they follow a protocol to assess if it is an opportunity that makes sense for the company.

Company H is a brand of wines. It is a family company operating in the market for more than one hundred and fifty years. The person interviewed is an administrator linked to exportation. When faced with the question about serendipitous opportunities, the administrator reminisced about a time when the company was introduced to a new market because of some informal contacts that reached the company. According to the

administrator, this contact happened due to the seal of quality and professionalism that the company has. The person who contacted them had tasted one of their wines in another country, and since it owned a chain of supermarkets in its home country, the person wanted to sell the wine in his supermarket and so “*It was not something planned*”.

Company I is a company that manufactures and sells Portuguese shoes. The person interviewed is a sales manager. It was evident to this person that what started this company’s internationalization path was a big international fair that the company attended. Although fairs can be perceived as a place where opportunities will be offered, it is important to keep in mind that serendipitous opportunities can also emerge in this context because the environment provides many different conditions.

Company J is an insurance company that offers a different service from what customers are used to having. The person interviewed was eager to say, “*That does not happen*”, when asked to tell a story about an internationalization opportunity occurring without the company being on the lookout for it. This company is very rational and only advances to a market if it is one hundred percent sure it will succeed. Proof of this is that despite having most of their offices and their team working in Portugal, the company still has not tackled the Portuguese market, as it prefers the neighbor’s countries.

Company K is an automation and add-ons company. The CEO not only refuted the hypothesis of serendipity, but also said that companies that recognize opportunities by chance are disorganized. This company is very technology-driven, and it was possible to see that it has tunnel-vision because it only thinks that the thing that can create an opportunity is the price of the products.

Company L is a brand of wines from the north of Portugal. The person interviewed is the owner of the brand and nowadays also the director of exportations. When asked about opportunities generated by serendipitous events, the owner recalled that especially happened in the first years the company started operating. He mentioned fairs but also gave particular relevance to informal contacts. He told the story about when he befriended someone in another country, and some years later, that person created a business and wanted to distribute their wines. Nowadays, the company stays alert to this type of events but usually hires a consultant after identifying a new market.

Company M is a toy company. The person interviewed is the manager of the company. When asked about an international opportunity that happened by chance, the manager responded, *“I cannot tell a history related to an opportunity like that because it never happened”*.

Company N is a company that works in the biscuits sector. The person interviewed is a market manager connected to exportations that acknowledged right away that these opportunities happen in every type of company. When asked to give an example that had happened in the company, the person being interviewed stated that it is very common to occur in fairs and informal contacts with former or current clients. She recalled a situation with a foreign client that had some ties to other countries, and because of that, the company expanded its territory.

Company O is an ornamental plants company. The person interviewed was the manager. He said these opportunities often happen *“in talks with clients, colleagues, and suppliers”*, where they can talk about some companies that may seem a good fit for the company. The manager stated that the next step is always to see if they can exploit this opportunity and see what is necessary to be successful.

Company P is a product design company with a significant focus on technology. The person interviewed is the founder of the company. The CEO recognized the importance of going to international conferences and fairs. Due to the exposition the company receives in these events, they can broadcast their business and reach many people, which results in establishing new contacts. Networking and doing the follow-up on these contacts is also considered vital to this company's CEO. Besides this, the company also invests in research and development programs to engage their internationalization.

At last, an association that will be designated as Association Q was also interviewed. To keep anonymity, it will not be revealed to what sector this association is linked to. This association brought light to an important event that was not yet much explored in the other interviews: external factors. The association gave the example that since Portugal is on the European's Counsel presidency, the market of Belgium became attractive. They saw that as an opportunity since the spotlight will be in Portugal for six months (the duration of the mandate) and as the person interviewed said *“this was an opportunity that we detected and so we added Belgium to the list of markets we wanted to activate it in 2021”*.

4.1 Analysis of codification on software Nvivo

With the help of the software Nvivo, it was possible to see specific patterns regarding some situations.

Table 2 presents the codification regarding the events that produce serendipitous potential. It includes categories from the literature review and the emergent ones (recognized in the interview process) about the events that can generate a serendipitous opportunity.

Table 2: Events

Type of Event	Files	References
Internal aspects	1	3
External aspects	3	4
Relational aspects	8	15
Fairs	8	8

This information regards the companies that were able to recognize a serendipitous opportunity. One of the most prominent events that produced the circumstances that lead to serendipity was relational aspects. This can mean that having an extensive network of contacts and engaging in somewhat informal conversations with clients, distributors, colleagues, etc. may trigger these opportunities. This event was highly mentioned in several authors' revision (Coviello and Munro, 1995; Fine and Deegan, 1996; Nahapiet and Ghoshal, 1998).

Fairs were also something that was mentioned a lot by the companies interviewed. It is important to be clear here: when the persons interviewed gave fairs as an example of a serendipitous opportunity that had occurred to them, it was because something they were not expecting happened because of the fair. Of course, when companies go to fairs, they

expect to get out of there with some contacts and deals in sight. But sometimes, they get out of there with deals they have never imagined, with contacts that generate other contacts and new markets. It is a volatile place, and many things can emerge from going to a fair because of that. This is an addition to the type of events that were mentioned in the revision of literature since none of the authors mentioned fairs. It is something that companies should pay more attention to and not take for granted, as it is possible to see that many benefits can come from attending this type of events.

External and internal factors were also mentioned in the interviews, but with minor relevance. Only three companies gave an example of external factors generating an opportunity (like legislation and politics), and only one gave an example of internal factors (and the firm's culture) having generated this kind of opportunities. External factors might be rarer because they depend on two things: on the factor itself (which can be a small thing like change in legislation) and also on the alertness of the company to this type of things (a small change in legislation can easily be undetected if the company is not alert). Internal factors were also rare in this study. The reason for that could be that it depends much on the company's culture, whether the company is trying to sell something innovative or has a proactive approach.

No examples were given about the analytical aspects, present in the serendipity – recognition – response model.

Taking all of this into consideration, regarding the events that can proportionate serendipitous opportunities, the revision of literature can be supported. Serendipity can be perceived as something that happens by chance or luck, but in reality, it results from a combination of different factors. Supplementing the type of events mentioned by the authors in the revision of literature, fairs can also be added to the type of events that produce serendipitous potential, since they were mentioned by many companies, leading to the conclusion that it is something with a high chance of happening.

In the previous chapter, it was stated that there is a set of characteristics the entrepreneurs must have to recognize serendipitous opportunities.

Table 3, Entrepreneurs' characteristics, presents the characteristics identified in the literature review and the results obtained in the different companies and associations.

Table 3: Entrepreneurs' characteristics

Characteristics	Files	References
Motivation	13	15
Curiosity	11	13
Alertness	13	17
Capacity of detecting matching pairs	13	15
Inclination to take risks	12	18
Social networks	13	16
Prior knowledge	13	20
Search for opportunities	13	17

Although it is possible to highlight some characteristics from Table 3 because they have more files/references, in general, they are all very close to each other. This means that the literature revision can be supported since the companies and association interviewed have the characteristics predicted. This result opens a conversation about if any characteristics are considered vital characteristics to be able to recognize a serendipitous opportunity and if there are different combinations of characteristics that can result in the expected outcome. This will be further analysed in the fsQCA analysis.

Four out of the sixteen companies and one association interviewed could not recognize serendipitous opportunities, and some even discredited the whole hypothesis of it being a real thing. The companies were: company E, company J, company K and, company M. It is then necessary to see what characteristics the entrepreneurs of these companies have and which ones they lack.

Company E, K, and M can be described as very product-driven companies that often have a special focus on technology and on developing the best product they can; consequently, they create a tunnel vision and are not alert to their surroundings.

Even when these types of opportunities are happening right in front of them, they do not recognize them. These companies sometimes have the set of skills that should allow them to be able to recognize the opportunity, like prior knowledge, motivation and inclination to take risks but because they have tunnel vision, and are blind to other aspects that surround the company they do not recognize the serendipitous opportunity. This happened with company E and M, since both the people interviewed from these companies stated that a serendipitous opportunity had never occurred to them.

Company J suffered from the same thing: it is so focused on the service it offers that it abruptly declared that these kinds of opportunities do not happen anywhere.

In table 4 it is present some companies' characteristics that were not predicted in the revision of literature. This table is about the core characteristics that some companies have that shape how they look at the company's surroundings, internally and externally. These characteristics are very important because they influence two things. They affect the conditions that generate serendipity (the events), and they affect the entrepreneurs' characteristics (which will affect their capability to recognize serendipitous opportunities).

These characteristics can help determine the firm's culture, and as was seen in the revision of literature, the company's culture can help trigger serendipity (Hao, 2002; Napier and Vuong, 2013).

But also, the characteristics of a company will influence the characteristics of its employees. For example, suppose a company has a strict policy of being averse to risk and not open to new things. In that case, it is expected that this behavior will influence its employees and their general behavior when working and making decisions.

Table 4: Companies' characteristics

Company's characteristics	Files	References
Innovation	4	5
Flexibility	3	4
Perseverance	2	2
Quality control	3	3
Knowledge	6	6

Note: In this context “knowledge” stands for a company that induces a culture of always wanting to learn more and promotes ongoing learning in the workplace.

It is important to note that these characteristics belong only to the companies that were able to recognize a serendipitous opportunity. Knowledge and Innovation were the most mentioned characteristics, which can mean that these characteristics might influence the circumstances that produce serendipity and the entrepreneur's capability to recognize a serendipitous opportunity. This information is an addition to the literature revision since none of these characteristics were mentioned by the authors.

The final step of this analysis is to assess if after the recognition of the serendipitous opportunity, companies tend to display a rational response or to improvise regarding the exploitation of the opportunity. From the companies studied that were able to recognize the serendipitous opportunity, all displayed a rational response to its exploitation.

The lack of results about improvisation does not mean that this is something that does not happen often. As it was proposed by the philosopher Karl Popper with The Falsification Principle “*no matter how many instances of white swans we may have observed, this does not justify the conclusion that all swans are white.*” (Popper, 2005, p. 33).

In general, the results obtained support the revision of literature.

4.2 Analysis using fsQCA software

To perform this analysis a specific question had to be asked in the interviews. Entrepreneurs were asked to rate the entrepreneurs' characteristics presented in the model of serendipity – recognition – response on a 7-point Likert scale spanning from 1: the entrepreneur does not have this characteristic at all, to 7: the entrepreneur fully has this characteristic and 4: neutral.³

Before using the tools provided by the fsQCA software, the data withdrawn from the interviews had to be inserted into the software and then calibrated. In Table 5 are the values attributed by each company to the set of characteristics. Acronyms replaced the name of the characteristics: “PK” (prior knowledge), “SO” (searching for opportunities), “SN” (social networks), “ITTR” (inclination to take risks), “Mot” (motivation), “Cur” (curiosity), “Ale” (alertness) and, at last, “DMP” (detecting matching pairs). These acronyms will be used throughout the whole analysis using the fsQCA software.

Table 5: Evaluation of entrepreneurs' characteristics

Companies	PK	SO	SN	ITTR	Mot	Cur	Ale	DMP
Company A	7	6	6	5	6	5	7	6
Company B	7	7	7	2	7	4	7	5
Company C	4	7	7	7	7	7	7	7
Company D	6	5	6	5	7	6	6	6
Company E	7	7	5	7	7	7	6	7
Company F	7	5	5	5	6	6	7	6
Company G	5	7	7	7	7	7	7	7
Company H	5	5	5	6	6	4	5	6

³ The association was excluded from this analysis because since we are evaluating entrepreneurs' characteristics, it does not make sense to include the association since entrepreneurs do not usually manage them.

Company I	7	7	7	6	7	7	7	7
Company J	5	7	6	7	7	6	5	4
Company K	5	4	2	1	4	4	4	4
Company L	6	7	5	6	7	6	7	7
Company M	5	6	4	6	7	6	6	6
Company N	6	7	7	6	7	7	6	6
Company O	7	5	7	5	7	6	7	6
Company P	7	7	7	7	7	7	7	7

“Recognize Opportunity” (RecO) also had to be inserted with this data, and as a result, it was used to identify the companies that were able to recognize a serendipitous opportunity from the ones that were not capable of doing that. The value 100 was given to the companies that recognized the opportunity and the value 0 was given to the companies that did not recognize it.

In this analysis, the characteristics become causal conditions, and it is necessary to calibrate them. To perform the calibration the values used were the maximum, mean, and minimum of each condition. Table 6 presents the values used to perform the calibration of each condition.

Table 6: Values to perform calibration

	PK	SO	SN	ITTR	Mot	Cur	Ale	DMP
Maximum	7	7	7	7	7	7	7	7
Mean	6	6.18	5.81	5.5	6.62	5.93	6.31	6.06

Minimum	4	4	2	1	4	4	4	4
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Regarding the output “Recognize Opportunity”, the maximum, mean, and minimum to perform the calibration were also used. In this case, since only four out of sixteen companies did not recognize the opportunity the maximum is 100, the mean is 75, and the minimum is 0. Figure 2 presents the calibration made automatically by the fsQCA software.

PK	SO	SN	ITTR	Mot	Cur	Ale	DMP	RecO
0.95	0.44	0.62	0.42	0.33	0.19	0.95	0.48	0.95
0.95	0.95	0.95	0.09	0.95	0.05	0.95	0.18	0.95
0.05	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
0.50	0.16	0.62	0.42	0.95	0.55	0.40	0.48	0.95
0.95	0.95	0.35	0.95	0.95	0.95	0.40	0.95	0.05
0.95	0.16	0.35	0.42	0.33	0.55	0.95	0.48	0.95
0.18	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
0.18	0.16	0.35	0.73	0.33	0.05	0.15	0.48	0.95
0.95	0.95	0.95	0.73	0.95	0.95	0.95	0.95	0.95
0.18	0.95	0.62	0.95	0.95	0.55	0.15	0.05	0.05
0.18	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.50	0.95	0.35	0.73	0.95	0.55	0.95	0.95	0.95
0.18	0.44	0.19	0.73	0.95	0.55	0.40	0.48	0.05
0.50	0.95	0.95	0.73	0.95	0.95	0.40	0.48	0.95
0.95	0.16	0.95	0.42	0.95	0.55	0.95	0.48	0.95
0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95

Figure 2: Calibration on fsQCA software

After doing this, it was possible to proceed with the analysis. Two analysis were performed: the necessary conditions analysis and the truth table algorithm analysis.

4.2.1 Necessary conditions analysis

This analysis provides the conditions that are necessary to reach a certain output. In this case, it will determine the conditions necessary to recognize a serendipitous opportunity. Consistency is the degree to which the causal condition is a superset of the outcome, and coverage is the empirical relevance of a consistent superset (Ragin, 2017). The values of

consistency higher than 0.9 are considered extremely necessary, and the values between 0.8 and 0.9 are considered almost always necessary (Rihoux and Ragin, 2009). Figure 3 presents the conditions tested and the values obtained in the analysis performed by the software. When “~” appears behind a condition it means that it is the negated form of the condition. For example “~PK” stands for “not prior knowledge”.

Analysis of Necessary Conditions		
Outcome variable: RecO		
Conditions tested:		
	Consistency	Coverage
PK	0.673276	0.858242
~PK	0.395690	0.665217
SO	0.683621	0.783597
~SO	0.385345	0.760204
SN	0.787931	0.900493
~SN	0.281034	0.557265
ITTR	0.667241	0.757339
~ITTR	0.401724	0.806228
Mot	0.839655	0.782958
~Mot	0.229310	0.747191
Cur	0.641379	0.796574
~Cur	0.427586	0.744745
Ale	0.836207	0.923810
~Ale	0.232759	0.490909
DMP	0.690517	0.857602
~DMP	0.378448	0.659159

Figure 3: Necessary conditions to recognize an opportunity

Not having a causal condition with consistency between 0.9 and 1 means that not one condition is mandatory in all recipes, so it is necessary to consider all characteristics in the research of the sufficient conditions (in the truth table analysis that will be presented in the next section).

According to the output, “motivation” and “alertness” are almost always necessary conditions to recognize a serendipitous opportunity, since its consistency is between 0.8 and 0.9. So, it is expected, these two conditions will be present in the majority of the possible solutions.

It was also analyzed what conditions were necessary to not recognize an opportunity. Figure 4 presents the conditions tested to not recognize an opportunity and the outcome of this analysis.

Analysis of Necessary Conditions

Outcome variable: ~RecO

Conditions tested:

	Consistency	Coverage
PK	0.475000	0.229670
~PK	0.706818	0.450725
SO	0.679545	0.295455
~SO	0.502273	0.375850
SN	0.411364	0.178325
~SN	0.770454	0.579487
ITTR	0.745454	0.320939
~ITTR	0.436364	0.332180
Mot	0.795454	0.281350
~Mot	0.386364	0.477528
Cur	0.613636	0.289079
~Cur	0.568182	0.375375
Ale	0.363636	0.152381
~Ale	0.818182	0.654545
DMP	0.484091	0.228051
~DMP	0.697727	0.460961

Figure 4: Necessary conditions to not recognize an opportunity

The consistency of the causal condition “not alertness” is between 0.8 and 0.9, meaning that in the majority of situations, a serendipitous opportunity is not recognized because entrepreneurs are not alert to their surroundings.

It can be argued that the condition of alertness is a central condition. On the one hand, “alertness” is almost always a necessary condition for an entrepreneur to be able to recognize a serendipitous opportunity. On the other hand, “not alertness” is almost always necessary to not recognize a serendipitous opportunity, making this condition central and very important in the rest of the analysis and the study. This condition will probably appear in many of the causal combinations present in the truth table analysis.

These results support the statements presented by Napier and Vuong (2013) in the revision of the literature section, as both these authors believe that alertness is part of the group of characteristics entrepreneurs should have to recognize a serendipitous opportunity.

4.2.2 Truth Table Algorithm analysis

The truth table analysis provides the causal combinations that are possible to reach the same output. In this study, this gives different possibilities of causal conditions (entrepreneurs' characteristics) that together can result in recognizing a serendipitous opportunity. Usually, the causal conditions considered extremely necessary are left out of this analysis because they would appear in all combinations if kept. However, since none was identified in the previous analysis, all causal conditions will be used.

As stated in the methodology section, only two solutions from the truth table analysis will be used and analyzed: the intermediate solution and the parsimonious solution.

Figure 5 presents the output of the intermediate solution. Raw coverage is what measures the proportion of memberships in the outcome of the solution; unique coverage measures the proportion of memberships in the outcome explained by each individual solution term and, consistency measures the degree to which membership in each solution term is a subset of the outcome (Ragin, 2017).

```

--- INTERMEDIATE SOLUTION ---
frequency cutoff: 1
consistency cutoff: 0.894089
Assumptions:

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	raw coverage	unique coverage	consistency
SO*SN*ITTR*~Mot*Cur*~Ale*DMP	0.456897	0.347414	0.923345
~PK*~SO*~SN*ITTR*~Mot*~Cur*~Ale*~DMP	0.109483	0.0318965	1
PK*~SO*SN*~ITTR*~Mot*~Cur*~Ale*~DMP	0.143966	0.0163793	1
PK*~SO*~SN*~ITTR*~Mot*Cur*~Ale*~DMP	0.121552	0.0146552	1
PK*SO*SN*ITTR*~Mot*~Cur*~Ale*~DMP	0.196552	0.0663794	0.946058
PK*~SO*SN*ITTR*~Mot*Cur*~Ale*~DMP	0.175862	0.0517242	0.940092
solution coverage:	0.675		
solution consistency:	0.946796		

Figure 5: Truth table analysis - intermediate solution

Since the consistency of all the results is higher than 0.75 (Ragin, 2008), all six causal combinations are deemed possible to occur. The first causal combination is composed of 7 causal conditions, while the remainders are all composed of 8 causal conditions.

The first causal combination is composed of “search opportunities”, “social networks”, “inclination to take risks”, “motivation”, “curiosity”, “alertness”, and “capacity of detecting matching pairs”. This is the easiest combination to explain: all characteristics are present

(except prior knowledge). This means that if entrepreneurs actively search for opportunities, have social networks, have inclination to take risks, are motivated, curious, alert to their surroundings, and have the capacity of detecting matching pairs, they will successfully recognize a serendipitous opportunity. This causal combination fully supports the revision of literature, since almost all conditions referred in the literature revision are present in this causal combination. As predicted in the analysis of the necessary conditions, the causal conditions “motivation” and “alertness” are present in this causal combination.

The second causal combination is composed of “not prior knowledge”, “not search opportunities”, “not social networks”, “inclination to take risks”, “not motivation”, “not curiosity”, “not alertness” and “not capacity of detecting matching pairs”. This combination is very interesting to look at. It is possible to have entrepreneurs who do not have almost any of the characteristics studied but tend to take risks. That step to get out of the comfort zone and take a chance can alone lead to the recognition of a serendipitous opportunity. But will the outcome of this combination always be positive for the company? It should be noted that having an inclination to take risks without knowledge is important, but negative things can also emerge from this, such as taking excessive, not balanced, risks.

The third causal combination is composed of “prior knowledge”, “not search opportunities”, “social networks”, “not inclination to take risks”, “not motivation”, “not curiosity”, “alertness”, “not capacity of detecting matching pairs”. This combination of characteristics demonstrates that possessing prior knowledge, having social networks, and being alert to the surroundings can lead to the recognition of a serendipitous opportunity even when the entrepreneur is not searching for opportunities, is not inclined to take risks, is not motivated, is not curious and does not have the capacity of detecting matching pairs. Having prior knowledge and social networks while being alert can be enough to do this recognition. As seen in the previous analysis, the almost always necessary causal condition “alertness” is present in this combination, but the same does not happen for the other almost always necessary causal condition “motivation”. This can lead to the assumption that “motivation” can be replaced when the entrepreneur has prior knowledge, social networks and, at the same time, is alert to the surroundings.

The fourth causal possible combination is composed of “prior knowledge”, “not search opportunities”, “not social networks”, “not inclination to take risks”, “not motivation”,

“curiosity”, “alertness” and “not capacity of detecting matching pairs”. These characteristics, together, can lead to the recognition of a serendipitous opportunity. “Curiosity” is very important as it means that the entrepreneur is open to new things. Together with alertness and prior knowledge, it is easy to understand why this results in the desired outcome. Once again, in this combination, it is possible to see the almost always necessary causal condition “alertness” but not the almost always necessary causal condition “motivation”. In this case, entrepreneurs that have prior knowledge and curiosity, and at the same time, are alert to the surroundings, do not need to be motivated to be able to recognize a serendipitous opportunity.

The fifth causal combination is composed of many characteristics, such as “prior knowledge”, “search opportunities”, “social networks”, “not inclination to take risks”, “motivation”, “not curiosity”, “alertness”, “not capacity of detecting matching pairs”. This means that if entrepreneurs have prior knowledge, search for opportunities, have social networks, are motivated, and alert to their surroundings, collectively, having these characteristics makes it possible for entrepreneurs to identify a serendipitous opportunity, even when they are not inclined to incur in risks, are not curious, and do not have the capacity to detect matching pairs. In this combination, as predicted, the almost always necessary causal conditions “motivation” and “alertness” are present.

The last causal combination is comprised of “prior knowledge”, “not search opportunities”, “social networks”, “not inclination to take risks”, “motivation”, “curiosity”, “alertness” and “not capacity of detecting matching pairs”. This causal combination tells us that it is not necessary to search for opportunities or take any risks to identify a serendipitous opportunity. Instead, the simple act of having knowledge, social networks, being motivated, curious, and alert can lead to the expected outcome. This combination also presents the almost always necessary causal conditions “motivation” and “alertness”.

It should be noted that “prior knowledge” is in almost all causal combinations of the intermediate solution (four out of six), bringing attention to its importance. Having appropriate knowledge always adds value to a company’s operations. Knowledge is at the core of the internationalization process (Johanson and Vahlne, 1977) and is considered very important to the recognition of serendipity by Dew (2009). Also, “social networks”, as it appears in four out of the six causal combinations. This also translates on the importance of

this causal condition, as several authors suggested that networks of relationships are very critical in the internationalization process (Hakansson and Snehota, 1989) and also with serendipitous opportunities (Coviello and Munro, 1995; Fine and Deegan, 1996; Nahapiet and Ghoshal, 1998). On the other hand “not capacity of detecting matching pairs” is almost always present in these causal combinations (five out of six). This can lead to the assumption that this capacity of being able to piece together information, as stated by Rond (2014), might not be as a fulcrum as the other characteristics mentioned in the revision of literature.

Figure 6 presents the output of the parsimonious solution.

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--- PARSIMONIOUS SOLUTION ---
frequency cutoff: 1
consistency cutoff: 0.894089

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	raw coverage	unique coverage	consistency
Ale	0.836207	0.594828	0.92381
ITTR*~Cur	0.293103	0.0068965	0.809524
ITTR*~Mot	0.186207	0	1

```

solution coverage: 0.887931
solution consistency: 0.899563

```

Figure 6: Truth table analysis - parsimonious solution

Since the consistency of the three causal combinations is higher than 0.75, they are all going to be considered.

The first causal combination is only composed of one causal condition: “alertness”. This means that sometimes being alert to the surroundings is enough to recognize a serendipitous opportunity. It is interesting to notice that, this causal condition was previously considered an almost always necessary condition to recognize a serendipitous opportunity, so it makes sense that it is present in a causal combination of the parsimonious solution (which is a solution that offers simple logical solutions).

The second causal combination is composed of “inclination to take risks” and “not curiosity”. It is possible to have an entrepreneur that has an inclination to take risks and, at the same time, is not curious, so this particular causal combination can also lead to the recognition of a serendipitous opportunity. This combination does not have present the almost always necessary conditions “motivation” and “alertness”. This can be explained by

the fact that the parsimonious solution is composed of simpler logical solutions, and the outcome of this particular combination might be simpler than the almost always necessary conditions.

At last, the third causal combination is composed of “inclination to take risks” and “not motivation”. This combination is very similar to the previous one, but instead of the entrepreneur not being curious, in this case, it is not motivated. This can also lead to the recognition of a serendipitous opportunity.

The second (“inclination to take risks” and “not curiosity”) and third causal combination (“inclination to take risks” and “not motivation”) of the parsimonious solution can be considered a subset of the second causal combination of the intermediate solution (“not prior knowledge”, “not search opportunities”, “not social networks”, “inclination to take risks”, “not motivation”, “not curiosity”, “not alertness” and “not capacity of detecting matching pairs”), which makes sense since the parsimonious solution produces a logically simpler solution.

The combination of the results provided by the intermediate solution and the parsimonious solution can clearly show the centrality of the almost always necessary conditions “motivation” and “alertness” since that in the combined nine causal combinations, the almost always necessary causal conditions are present in six causal combinations (with two or only one of them present). Moreover, out of the two almost always necessary causal conditions, the most prominent is “alertness” as it appeared in more causal combinations alone than “motivation”. This latter conclusion goes in hand with what was concluded in the final part of section 4.2.1. - Necessary conditions analysis. In that analysis, “alertness” was also considered a vital condition. This way, this analysis also supports the revision of literature.

Even though the fsQCA analysis only studied the characteristics the entrepreneurs need to have to recognize a serendipitous opportunity; it was very important to this study on a general level.

First, with the analysis of the necessary conditions, it was possible to ascertain that none of the characteristics identified in the revision of literature is an extremely necessary condition for the recognising of a serendipitous opportunity. This does not mean that these

characteristics can be discarded; it means that no characteristic is mandatory and not substitutable. Different combinations can lead to the same end.

Second, the truth table algorithm analysis provided a new look at the characteristics presented in the literature revision: a strategic eye, since it offered us different types of combinations of characteristics that can lead to the same outcome.

This analysis complements the previous analysis, as it enriches us with a new perspective. It was learned with the analysis of the necessary conditions that there is no crucial characteristic that the entrepreneurs have to have to recognize an opportunity; none condition is mandatory. The truth table analysis complements this analysis; several combinations of different characteristics can lead to the same result.

Overall, it should be retained that there is not a unique recipe for entrepreneurs to follow. As stated before, one of the main advantages of this methodology is its equifinality, meaning that it assumes reaching the same output with different paths. Also, there is not an extremely essential condition. There is not a perfect entrepreneur; there are several types of entrepreneurs with different characteristics and combinations that lead to the same output. Entrepreneurs must be open and combine diverse characteristics, as it makes it more likely for them to recognize a serendipitous opportunity this way.

5. Conclusion

In this dissertation it was studied how serendipity can appear in the context of an internationalization process, what characteristics the entrepreneurs should have to recognize serendipitous opportunities and how does the internationalization process occur after that. To study that, two different methodologies were used: the Critical Incident Technique and the fuzzy-set Qualitative Comparative Analysis. To collect information, a set of interviews were conducted with various companies with different backgrounds.

The revision of literature demonstrated that some behaviors and characteristics together could result in serendipitous potential. The results obtained with the first methodology support the revision of literature about the events that produce serendipitous potential and the impact of certain characteristics on the recognition of a serendipitous opportunity. Regarding the response to the exploitation of the serendipitous opportunity, all companies interviewed that were able to recognize a serendipitous opportunity had a rational response to serendipity. The second part of the study focused on the characteristics the entrepreneurs should have (according to the revision of literature) to recognize a serendipitous opportunity. This methodology provided a more strategic look at serendipity, as it stated that there are no specific characteristics entrepreneurs must have to be able to recognize a serendipitous opportunity but rather, there are several different types of combinations of characteristics that can result in this recognition. So, there is not a unique recipe as there is not a perfect entrepreneur.

The results obtained in both methodologies are important because they shine a light on something that is often overlooked in the internationalization process: serendipity. Most people do not even know what serendipity means, and after explaining the term they tend to think it is something related to luck or chance. With this study, it is possible to see that this is not the case. Entrepreneurs (and companies) can adopt behaviors like a proactive approach, open culture, etc. By exposing themselves to these different aspects, it is more likely that a serendipitous opportunity will occur. From the interviews performed, the examples of events where serendipitous opportunities tend to occur most often were fairs and by having formal and informal social networks. Fairs were not mentioned in the literature revision, so it is a significant contribution to this field since more or less than half of the examples of serendipitous opportunities occurred because of fairs. It is then something that

should be taken into consideration in the future. A sceptical look should not be given to fairs. It is known that when companies go to fairs, they are expecting to get out of there with deals. However, the examples presented were all about opportunities the entrepreneurs were not expecting to happen (even though it is a fair). Since it is a volatile place, many things can happen in that environment since a lot of the circumstances that produce serendipity can be found there.

Another critical point is that it is also necessary that the entrepreneurs have the set of characteristics required to recognize an opportunity generated by serendipity because sometimes it happens that the opportunity is right there, but the entrepreneur is simply not able to recognize it. The characteristics studied were prior knowledge, social networks, searching for opportunities, inclination to take risks, motivation, alertness, curiosity, and capacity of detecting matching pairs.

The first methodology supported the revision of literature, since these characteristics were seen in the entrepreneurs of the companies that recognized an opportunity generated by serendipity. The second methodology studied the entrepreneurs' characteristics in depth and discovered that from the characteristics studied; none were proven to be extremely necessary for the recognition of a serendipitous opportunity to happen. Despite the fact that none of the characteristics were proven to be absolutely necessary, alertness and motivation were considered almost always necessary, and central conditions of the analysis. In addition, the study provided several different combinations of various characteristics that are shown to result in the recognition of a serendipitous opportunity.

In addition to this, a set of characteristics of the firm were identified in the interviews to the companies that were able to recognize a serendipitous opportunity. The characteristics were: innovation, flexibility, perseverance, quality control and knowledge. These characteristics are important since they influence the conditions that generate serendipity (the events) and affect the entrepreneurs' characteristics, which will affect their capability to recognize serendipitous opportunities.

The aim of this study is "to understand how serendipity can appear in the context of an internationalization process, what characteristics the entrepreneurs should have to recognize serendipitous opportunities and how does the internationalization process occur after that" and can now be answered: companies can create situations, get more involved and expose

themselves to chance. When this happens, some companies will recognize the serendipitous opportunity and take advantage of it, while others might have strategic blindness that will prevent them from seeing things that are beyond what was planned. To do this recognition, the entrepreneurs are not required to have any specific characteristic, but alertness and motivation were considered central characteristics. There were no results about improvisation, since all companies displayed a rational response to the exploitation of the opportunity.

These findings have both implications on an academic level and practical terms. At the academic level, it helps to fill a gap about serendipity. As it was stated at the beginning of this study, there are not many studies about serendipity in the context of internationalization. This study opened a door for future research to go further and extend the knowledge about this particular topic. On an educational level, these findings may also complement higher education, since this is something that should be taught on an entrepreneurial course, for example. On a practical level, this study provides insight to companies about generating more opportunities and how to recognize them. If entrepreneurs look at this study and start adopting this strategic look to their surroundings, they will be able to produce serendipitous circumstances and recognize serendipitous opportunities, which later might result in tackling a new market, for example. Hence, these findings can have a positive impact on a company, since evidence is given about the adoption of these behaviors and characteristics.

The biggest limitation of this study is that it is not possible to see the effect these findings will have on companies, as it would be necessary to do a follow-up to companies to access that information. Another limitation is the lack of results about improvisation in response to the exploitation of the opportunity and analytical aspects regarding the events that can produce serendipitous potential. From the companies that were able to recognize a serendipitous opportunity, all displayed a rational response to its exploitation. There were also no examples of analytical aspects producing the circumstances that generate a serendipitous opportunity.

There are a lot of future research ideas that can be generated from this study, like: including more characteristics in future studies, to see if the conclusion obtained in this study about a key characteristic not existing maintains, and also to have more different combinations of characteristics. Another suggestion is to do a study that focuses only on improvisation per se and to direct more questions about that matter in the interviews since this was not the

main focus of this study, and to see what usually leads to a strategic response instead of improvisation, for example. Future research should also examine the background of the entrepreneurs, not only academically but also personality traits and sociodemographic information like age and gender, to see if those traits are also a factor that influences the recognition of a serendipitous opportunity. Another suggestion would be to study serendipity and strategy. Some companies are not able to exploit serendipity because they have tunnel vision, and for that reason, it would be interesting to study if there are companies that exploit every opportunity they see and because of that they lose focus on their strategy, which can make the act of exploiting too many opportunities negative.

In conclusion, there are a set of circumstances that can be produced to induce serendipity and but there is not a single set of entrepreneurs' characteristics that help in the recognition of opportunities generated by serendipity, instead there are several combinations of different characteristics.

6. Appendix

6.1 Script of the interviews

1. Pergunta sobre o percurso académico e profissional;
2. Pergunta sobre o cargo atual: que funções desempenha;
3. Pedir para contar uma história em que foi reconhecida uma oportunidade de realizar uma internacionalização sem que estivessem à procura dela;
4. Pedir para descrever o processo de internacionalização que normalmente usam na empresa x;

As próximas perguntas dependem da resposta dada à pergunta número 3:

1. Que características da empresa lhe parecem ter sido fundamentais para poder reconhecer e aproveitar essa oportunidade inesperada?
2. Que características do empreendedor lhe parecem ter sido fundamentais para poder reconhecer e aproveitar essa oportunidade inesperada?

A última pergunta só deve ser feita no final da entrevista de modo a não enviesar as respostas dadas anteriormente:

1. De 1 a 7 (em que 1 é totalmente nada, 7 é completamente e o 4 é neutro) classifique as seguintes características que o empreendedor (a pessoa que teve a capacidade de descobrir a oportunidade e de a aproveitar ou o responsável pela tomada de decisões de internacionalização na empresa) tem:
 - Conhecimentos adequados;
 - Costuma procurar oportunidades;
 - Tem uma grande rede de contactos;
 - Tem uma inclinação para arriscar;

- É motivada;
- É curiosa;
- Está alerta para identificar possíveis oportunidades;
- É capaz de relacionar diferentes observações de maneira a detetar uma oportunidade.

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